Attributes	Description
Instrument	
Acronym	DLH
Full Name	Diode Laser Hygrometer
ResponsibleParty	
Name	Glenn Diskin
Affiliation	NASA Langley Research Center
Contact Info	757-864-6268, glenn.s.diskin@nasa.gov
ValidPeriod	Aug. 03 – Oct. 05, 2019
MeasurementVariables	H2O_DLH, H2O, water vapor volume fraction, parts per million RHi_DLH, RHi, relative humidity with respect to ice, percent RHw_DLH, RHw, relative humidity with respect to liquid, percent
TimeSynchOrigin	UTC time recorded by on-board GPS receiver synchronized with data acquisition
Manufacturer/Developer	NASA Langley Research Center
Model Number	N/A
Date/Serial Number	003
MeasurementUncertainty	
Overall	N/A
Accuracy (1 sigma)	5% (H2O), 15% (RHi, RHw)
Precision (1 sigma at 1 Hz)	0.1 % (H2O)
ObservableRange	H2O: 1 – 50000 ppm; RHi, RHw: no limitations
ObservingMethod	H2O measured by wavelength-modulated differential absorption RHi, RHw computed from measured H2O and NSRC-provided ambient temperature and pressure

Attributes	Description
ObservingMethodDetail	Optical absorption path is external to aircraft, between fuselage-mounted transceiver mounted at FS796.5 and tail-mounted retroreflector, with a total of ~9 m separation (~18 m total path). Native measurement time interval is approximately 0.01 sec; data are averaged to .05 sec and 1.0 sec prior to archiving.
ObservingMethodReference	Diskin, G.S.; Podolske, J.R.; Sachse, G.W.; and Slate, T.A.: "Open-Path Airborne Tunable Diode Laser Hygrometer," in Diode Lasers and Applications in Atmospheric Sensing, SPIE Proceedings 4817, A. Fried, editor, 196-204 (2002). Podolske, James R.; Sachse, Glen W.; and Diskin, Glenn S.: "Calibration and Data Retrieval Algorithms for the NASA Langley / Ames Diode Laser Hygrometer for the NASA TRACE-P Mission," Journal of Geophysical Research, 108, D20, 8792, doi:10.1029/2002JD003156, 2003. Rothman, L.S., et al., “The HITRAN2012 molecular spectroscopic database,” Journal of Quantitative Spectroscopy and Radiative Transfer, vol. 130, pp. 4-50 (2013).
CalibratingMethod	Instrument is not calibrated, per se. Instrument dynamic wavelength tuning is characterized, water vapor absorption parameters from HITRAN 2012 (see references) are used to convert absorption to mixing ratio.
CalibrationStandard	N/A
CalibrationLog	N/A
samplingStrategy	External path optical absorption
sampleTreatment	None
sampleTreatmentDescription	N/A
samplingProcedure	Optical beam is propagated in a double-pass arrangement outside the aircraft in a relatively undisturbed portion of the flow.
samplingProcedureDescription	N/A
DataProcessing	A validated instrument model is used to convert measured absorption signal, along with separately measured ambient pressure and temperature, to water vapor volumetric mixing ratio
softwareDetails	N/A

Attributes	Description
DataReportingInformation	Water vapor volumetric mixing ratio, relative humidities, at 1 Hz, 20 Hz, or other desired averaging times.
Subequipment	